NON-PUBLIC?: N
ACCESSION #: 9306280126
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Davis-Besse Unit Number 1 PAGE: 1 OF 4

DOCKET NUMBER: 05000346

TITLE: Reactor Trip - Loss of ICS Tave Input
EVENT DATE: 05/20/93 LER #: 93-003-00 REPORT DATE: 06/17/93

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: Mark A. Turkal, Engineer - Nuclear TELEPHONE: (419) 321-7377
Licensing

COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT:

On May 20, 1993, at 1138 hours, the plant experienced a trip from approximately 102% power. Loss of continuity between a fuse and fuseholder resulted in a loss of power to an auxiliary relay in the Non-Nuclear Instrumentation (NNI) System. This caused a loss of the selected RCS average temperature (Tave) input to the Integrated Control System (ICS). The ICS Tave input failed to zero VDC indicating that the RCS average temperature was approximately 570 degrees F. Normal RCS average temperature is 582 degrees F. To compensate, the ICS Tave integral increased Reactor Demand, withdrawing control rods and increasing reactor power. In an attempt to reduce reactor power, operators took manual control of ICS and decreased the Steam Generator/Reactor Demand signal. The primary reactor operator overreacted and lowered demand too far. Primary to secondary heat flow became unbalanced as feedwater flow followed the lowered demand, but reactor power did not decrease due to the low Tave input. As feedwater

flow decreased, RCS pressure increased. The reactor tripped on high RCS pressure.

The faulty fuse cap and fuse were replaced and other NNI fuse holders and fuses were inspected. The plant was returned to service on May 21, 1993 at 1308 hours.

END OF ABSTRACT

Figure "Required Number of Digits/Characters for Each Block" omitted.

Description of Occurrence:

On May 20, 1993, the plant was in Mode 1 at approximately 100% reactor power. The event began at 1135 hours when loss of continuity between a fuse and fuseholder resulted in de-energizing of auxiliary relay 86/RC7A in the Non-Nuclear Instrumentation (NNI) System. Loss of power to the auxiliary relay caused the loss of the selected Integrated Control System (ICS-JA) Reactor Coolant System (RCS-JD) average temperature (Tave) input. The ICS provides automatic coordination of the reactor, steam generator feedwater control, and turbine. The ICS includes four independent subsystems: (1) the Unit Load Demand Control, (2) the Integrated Master Control, (3) the Steam Generator Control, and (4) the Reactor Control. The four ICS subsystems were automatically controlling the plant when Tave failed.

The loss of Tave resulted in an erroneous input to the ICS indicating that the RCS average temperature was approximately 570 degrees F. Normal RCS average temperature is 582 degrees F, which was the approximate RCS average temperature at this time. As a result, the ICS attempted to recover normal RCS average temperature by withdrawing control rods, increasing reactor power to approximately 102%. The ICS includes a Reactor Demand High Power Limiter which prevents the ICS from demanding a power greater than 103% to prevent exceeding an RPS channel high flux trip setpoint.

In a proper attempt to reduce reactor power, operators took manual control of the ICS and decreased the Steam Generator/Reactor Demand signal. The primary reactor operator erred, however, as he overreacted to the conditions and manually lowered demand to approximately 80% of full power without properly informing the balance of the operating crew. Primary to secondary heat flow became unbalanced as feedwater flow decreased without a corresponding decrease in reactor power due to the low Tave input failure. As feedwater flow decreased, RCS pressure increased. The Reactor Protection System (JC) properly tripped the reactor on high RCS pressure (trip setpoint - less than or equal to 2355 psig) at 1138 hours. Maximum indicated RCS pressure was 2350 psig based on plant computer data.

Redundant sensors for major system parameters are available to the ICS. The ICS inputs are monitored by 19 Smart Analog Selector Switch (SASS) channels designed to automatically transfer to a redundant sensor in case of instrumentation problems. The SASS channel monitoring RCS average temperature did not transfer in this event because the failure was downstream of the SASS.

The plant was returned to service on May 21, 1993 at 1308 hours.

Description of Occurrence: (con't)

Initial notification of the reactor trip was made on May 20, 1993, at 1258 hours, in accordance with 10 CFR 50.72(b)(2)(ii). This LER is being submitted in accordance with 10 CFR 50.73(a)(2)(iv).

Apparent Cause of Occurrence

The plant transient was initiated by a loss of continuity between a fuse and fuseholder in the circuit that powers an auxiliary relay for Tave input selection to the ICS. The reactor trip resulted from operator action taken in an attempt to decrease reactor power.

A loss of continuity between a fuse and fuseholder resulted in de-energizing of auxiliary relay 86/RC7A in the NNI system. Loss of power to the auxiliary relay caused the loss of the selected ICS Tave input which provided an erroneous input to the ICS indicating that the RCS average temperature was approximately 570 degrees F. Normal RCS average temperature is 582 degrees F. As a result, the ICS attempted to recover normal RCS average temperature by withdrawing control rods and increasing reactor power to approximately 102%. In an attempt to reduce reactor power, operators took manual control of ICS and decreased the Steam Generator/Reactor Demand signal. Feedwater flow decreased, however, reactor power did not due to the low Tave input. As feedwater flow decreased, RCS pressure increased. The RPS functioned properly by tripping the reactor on high RCS pressure.

Analysis of Occurrence

The event reported in this LER has minimal safety significance.

Plant and operating crew response to the trip was satisfactory. The Control Rod Drive trip breakers opened and all control rods inserted on the reactor trip as
esigned. Steam generator pressure increased due to
the closing of the main turbine stop valves. The Turbine Bypass Valves and the Atmospheric Vent Valves (AVVs) properly opened and the Main Steam Safety Valves (MSSVs) lifted in response to the increasing secondary system pressure. The MSSVs and AVVs closed as steam generator outlet pressure decreased.

Shortly before the reactor trip, there was an undetected lockup of the Safety Parameter Display System (SPDS). As a result, the SPDS was not available to the control room operators post-trip. The failure of the SPDS was not associated with the reactor trip and did not affect the operators' ability to respond to the event. The SPDS was returned to service at approximately 1150 hours and pertinent transient data is available.

Corrective Action

The faulty fuse cap and fuse were replaced and the remaining 37 NNI fuse holders and fuses associated with SASS instrumentation were inspected. No additional faulty fuse holders or fuses were discovered, however, seven fuses and one fuse cap were replaced as a precautionary measure.

Operations personnel completed required reading regarding the failure of Tave, the plant's response, and general guidance for ICS transients.

Subsequent to the event, simulator training on the transient was initiated. Each operating crew will complete this training by June 25, 1993. Control room team training, in association with INPO, is scheduled for completion by July 30, 1993.

Failure Data

There have been no LERs due to ICS initiated transients in the previous three years. Also, there have been no LERs in the previous three years due to reactor trips resulting from operator action.

NP 33-93-003 PCAQ No. 93-0311

ATTACHMENT 1 TO 9306280126 PAGE 1 OF 1

TOLEDO
EDISON

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TOLEDO, OHIO 43652-0001

AB-93-0020
NP-33-93-03

Docket Number 50-346

License Number NPF-3

June 17, 1993

United States Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Gentlemen:

LER 93-003
Davis-Besse Nuclear Power Station, Unit Number 1
Date of Occurrence - May 20, 1993

Enclosed please find Licensee Event Report 93-003, which is being submitted to provide 30 days written notification of the subject occurrence. This LER is being submitted in accordance with 10 CFR 50.73(a)(2)(iv).

Very truly yours,

Louis F. Storz
Plant Manager
Davis-Besse Nuclear Power Station

LFS/lkg

enclosure

cc: Mr. J. B. Martin
Regional Administrator
USNRC Region III

Mr. Stan Stasek

DB-1 NRC Senior Resident Inspector

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